

Application No. 10/822,345  
Amendment dated November 6, 2006  
Reply to Office Action mailed October 24, 2006

Attorney Docket No. 124263-1019

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REMARKS

Applicants have carefully reviewed the Office Action mailed July 11, 2006. Claims 1-27 were pending in this Application. Claims 1, 3, 4, 6-9, 12, 14, 15, 17-19, 21, 22, and 24-26 have been amended. Claims 10, 16, 20, 23 and 27 have been cancelled without prejudice or disclaimer.

CLAIM REJECTIONS UNDER 35 USC § 112

The Examiner rejected claim 4 under 35 USC § 112, second paragraph, as being indefinite for failure to particularly point out and distinctly claim the invention. The Examiner stated: "Specifically, claim 4 recites the limitation, the oxygen-containing ambient in line 1. There is insufficient antecedent basis for the limitation in the claim."

In response, Applicants have amended claim 4 so that claim 4 now depends from claim 3. Claim 3 recites the limitation "oxygen-containing ambient", thus providing the necessary antecedent basis. As such, Applicants request that the Examiner withdraw this rejection.

CLAIM REJECTIONS UNDER 35 USC § 103

The Examiner rejected Claims 1-9, 11-19, and 21-26 under 35 USC § 103(a) as being unpatentable over U.S. Patent No. 6,613,677 to Herbots et al. (the "Herbots reference") in view of U.S. Patent No. 6,921,702 to Ahn et al. (the "Ahn reference").

Independent Claim 1, as amended, recites the following step:

passivating a semiconductor surface by forming one atomic layer of a valence-mending agent on the semiconductor surface to eliminate dangling bonds on the semiconductor surface, the valence-mended semiconductor surface substantially retaining its semiconductor properties;

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In rejecting Claim 1, the Examiner said that the Herbots reference discloses the step of "preparing a passivated semiconductor surface using a valence-mending agent [see col. 9, lines 1-4]."

Applicants respectfully submit that the Herbots reference does not teach the step of passivating a semiconductor surface using a *valence-mending agent, i.e., the process of valence-mending*. An examination of Col. 9, lines 104 of the Herbots reference shows there is no teaching or suggestion of *valence-mending*. The Herbots reference, in Col. 9, lines 1-4, discusses "empty chemical valence bonds", which is not equivalent to valence-mending.

Applicants respectfully submit that *valence-mending* is a method to terminate all dangling bonds on a semi-conductor surface by depositing *one atomic layer* of a different element. Since there is only one atomic layer of valence-mending atoms on the passivated semiconductor surface, the surface retains its semiconductor properties, i.e., the surface is still semiconducting after valence-mending.

According to Herbots (Col. 20, lines 30-35), the thickness of the oxide layer is between 0.5 and 10.0 nm, which is significantly greater than the thickness of one atomic layer (approximately 0.15 nm). As such, the oxide layer of Herbots becomes an insulating layer, and thus the semiconductor surface with an oxide layer of a thickness between 0.5 and 10.0 nm loses its semiconductor properties.

In contrast, Claim 1, as amended, recites valence-mending by forming one atomic layer. Since the thickness of one atomic layer is approximately 0.15 nm, the layer is transparent to charge carriers, thus allowing the valence-mended surface to substantially retain its semiconductor properties.

Applicants have amended Claim 1 to more clearly distinguish from the Herbots reference. Specifically, Claim 1 has been amended to recite that the semiconductor layer is passivated using "one atomic layer of a valence-mending agent" and to recite "valence-mended semiconductor surface substantially retaining its semiconductor properties."

Application No. 10/822,345  
Amendment dated November 6, 2006  
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Attorney Docket No. 124263-1019

Applicants respectfully submit that neither the Ahn reference nor the Boland article "Structure of the H-Saturated Si (100) Surface", also cited by the Examiner, disclose the step of *passivating a semiconductor surface by valence-mending*.

As stated by the Federal Circuit in *In re Vacck*, 947 F.2d 488 (Fed. Cir. 1991), to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must be found in the prior art, and not based on Applicant's disclosure.

Applicants respectfully submit that neither the Ahn reference nor the Boland article teach or suggest *passivating a semiconductor surface by valence-mending*. Thus, there is no motivation or suggestion in either the Ahn reference or the Boland reference to combine their teachings to the Herbots reference.

Accordingly, Applicants request that the Examiner withdraw the rejection of Claim 1 and pass Claim 1 to allowance. Claims 2-9, and 11-13 depend from Claim 1, and these dependent claims include the limitations of Claim 1. Applicants request that the Examiner pass these dependent claims to allowance.

Independent Claims 14 and 21 all generally recite the same limitations as recited in Claim 1. Applicants submit that Claims 14 and 21 are allowable for the same reasons recited above. Claims 15, and 17-19 depend from Claim 14, and Claims 22, and 24-26 depend from Claim 21. Allowance of these dependent claims is respectfully requested.

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Conclusion

In light of the Amendments and arguments presented above, Applicants respectfully submit that the claims pending in this application are in condition for allowance. Favorable consideration for and allowance of the pending claims are therefore respectfully requested.

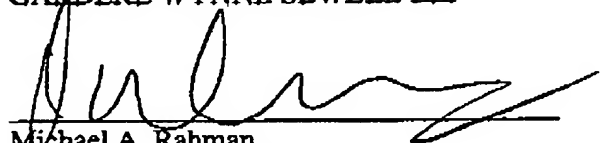
No fees are believed to be due with this Amendment. If this is incorrect, Applicant hereby authorizes the Commissioner to charge such fees, other than the issue fee, that may be required by this paper to Deposit Account 07-0153.

If the Examiner has any questions or comments, or if further clarification is required, it is requested that the Examiner contact the undersigned at the telephone number listed below.

Dated: November 6, 2006.

Respectfully submitted,

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